HOMESTAKE
Grants Project

Homestake Mining Company of California

Thomas Wohlford
Closure Manager

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U.S. Nuclear Regulatory Commission
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Mr. Ron C. Linton, Project Manager
Uranium Recovery and Material Decommissioning Branch
Division of Decommissioning, Uranium Recovery, and Waste Programs
Office of Nuclear Material Safety and Safeguards
Mail Stop: T-5A10
U.S. Nuclear Regulatory Commission
Washington, DC 20555

RE: Homestake Mining Company of California – Grants Reclamation Project – NRC License SUA-1471, Request for Clarification Regarding Use of 5-Spot Injection/Collection Pattern for Site Remediation

Dear Mr. Linton:

Homestake Mining Company of California (HMC) respectfully requests clarification that HMC is allowed to use of the 5-spot injection/collection method for remediation at the Grants Reclamation Project. HMC is proposing to complete a SERP regarding the use of the 5-spot injection/collection well pattern and seeks clarification from the NRC whether this is indeed appropriate for a SERP or whether the License should be amended to specifically include the 5-spot injection/collection method as an approved form of remediation.

An initial evaluation by HMC indicates that without the use of the 5-spot injection/collection well pattern, the Standard Operating Procedure for the 300 and 1,200 gallons per minute zeolite remediation systems will have to be modified. The modification will include requiring that the operator turn off the plume interior injection wells whenever the zeolite systems are down for regeneration and/or cleanings. This will prevent plume interior injection occurring without collection, which could lead to plume dispersal over time.

The 5-spot injection/collection method, typically used in In-Situ Recovery (ISR) of uranium projects, was proposed by HMC in our Status Report: Remediation Strategy dated October 8, 2014 and submitted to the NRC (ML14283A116). The remediation strategy included accelerating groundwater collection in North Off-Site and South Off-Site groundwater plumes through injection of compliant water from the Reverse Osmosis (RO) and zeolite treatment systems into wells within the plume. The injected water would help push the uranium-impacted groundwater in the plumes towards the collection wells.

HMC performed a Safety and Environmental Review (SERP) of this change to the remediation strategy on February 4, 2015 (HMC SERP 15-01). The SERP concluded that groundwater

injection was an NRC-approved form of remediation for the site as per the September 1989 *Corrective Action Plan* (CAP) approved by the NRC as License Condition 35C and the September 15, 1998 *Request for Change in Groundwater Restoration Plan* which was also approved as part of License Condition 35C.

SERP 15-01 was reviewed by the NRC during the April 24-26, 2017 NRC site inspection. The NRC inspectors concluded that review, approval and implementation of the SERP 15-01 was contrary to the requirements of License Condition (LC) 35C because the new methodology consisted of injection of compliant water directly into impacted portions of the alluvial aquifer. Injection of compliant water directly into the contaminated portion of the aquifer was considered dilution, which was not considered to be an NRC-approved corrective action option (page 6, *NRC Inspection Report 040-08903/2017-001 and Notice of Violation*, ML17164A088).

HMC's use of 5-spot injection was identified as another example of the apparent violation of LC 35C requirements presented in the NRC's letter to the licensee dated October 4, 2016 (ML16251A526). Therefore, use of the methodology came under the Confirmatory Order issued on March 28, 2017 (ML17061A455), and required evaluation of its impact.

HMC discontinued the use of the 5-spot pattern on July 10, 2017. HMC notified the NRC in a technical memo *Off-Site Restoration without 5-Spot Well Pattern* dated August 7, 2017 (ML17236A177) that it had ceased using the pattern and indicated that it would perform an evaluation using the current groundwater flow model for the site to simulate remediation using both the 5-spot well pattern and the linear injection well pattern. The groundwater modeling simulations showed that remediation efforts would be marginally better when using the 5-spot injection/collection well pattern, with predicted time of remediation reduced by approximately one year. A copy of the Technical Evaluation Report titled *Linear Off-Site Injection Well Configuration Remediation Program Comparison*, October 2017, regarding the groundwater modeling simulations has been included with this letter.

HMC requests clarification regarding its ability to use the 5-spot injection/collection well pattern because as efforts to increase Reverse Osmosis and zeolite remediation system rates have proven more successful, more compliant water is being created for injection. Without the 5-spot pattern, none of the plume interior injection wells can be used for injection of the increased volume of water, necessitating the installation of additional injection wells outside the control area.

A review of the September 1989 *CAP* and the September 15, 1998 *Request for Change in Groundwater Restoration Plan* indicates that injection wells were used historically within the plume interior. Specifically, in the 1989 CAP, injection wells GW1, GW2 and GW3 were installed upgradient from the "G" injection wells along the southern property boundary with Broadview Acres (see attached Figure 1 in Attachment A). Within the 1998 Request for *Change in Groundwater Restoration Plan*, it was indicated that "*The RO product water may also be injected into the alluvial aquifer within the contaminated plume (control zone) to assist in the extraction of contaminants in the proximity of the tailings pile*." Therefore, it appears that even though the 5-spot injection/collection method was not used specifically in the past, injection within the plume to help push the contaminants towards collection wells was used and is an approved method as per the site's License.

The afore-mentioned documents have been included with this clarification request to aid the

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NRC in its evaluation of this issue. They are as follows;

- Corrective Action Plan, September 1989;
- Request for Change in Groundwater Restoration Plan, September 15, 1998;
- Status Report: Remediation Strategy, October 8, 2014;
- NRC Inspection Report 040-08903/2017-001 and Notice of Violation;
- Off-Site Restoration without 5-Spot Well Pattern, 07 August 2017; and
- Linear Off-Site Injection Well Configuration Remediation Program Comparison, October 2017.

HMC appreciates the NRC's time and attention on this matter and hopes this can be resolved quickly in order to facilitate the use of the originally proposed 5-spot injection/collection method. If you have any questions, please do not hesitate to contact me via e-mail at twohlford@homestakeminingcoca.com or via phone at 505.290.2187.

Respectfully,

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Copy To:

A. Winton, NMED (electronic and hard copy)
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C. Burton, Barrick, Henderson, Nevada (electronic copy)
G. Hoffman, Hydro-Engineering, Casper, Wyoming (electronic copy)
R. Whicker, Environmental Restoration Group, Albuquerque, New Mexico (electronic copy)

ATTACHMENT A – Figure Showing Injection Wells

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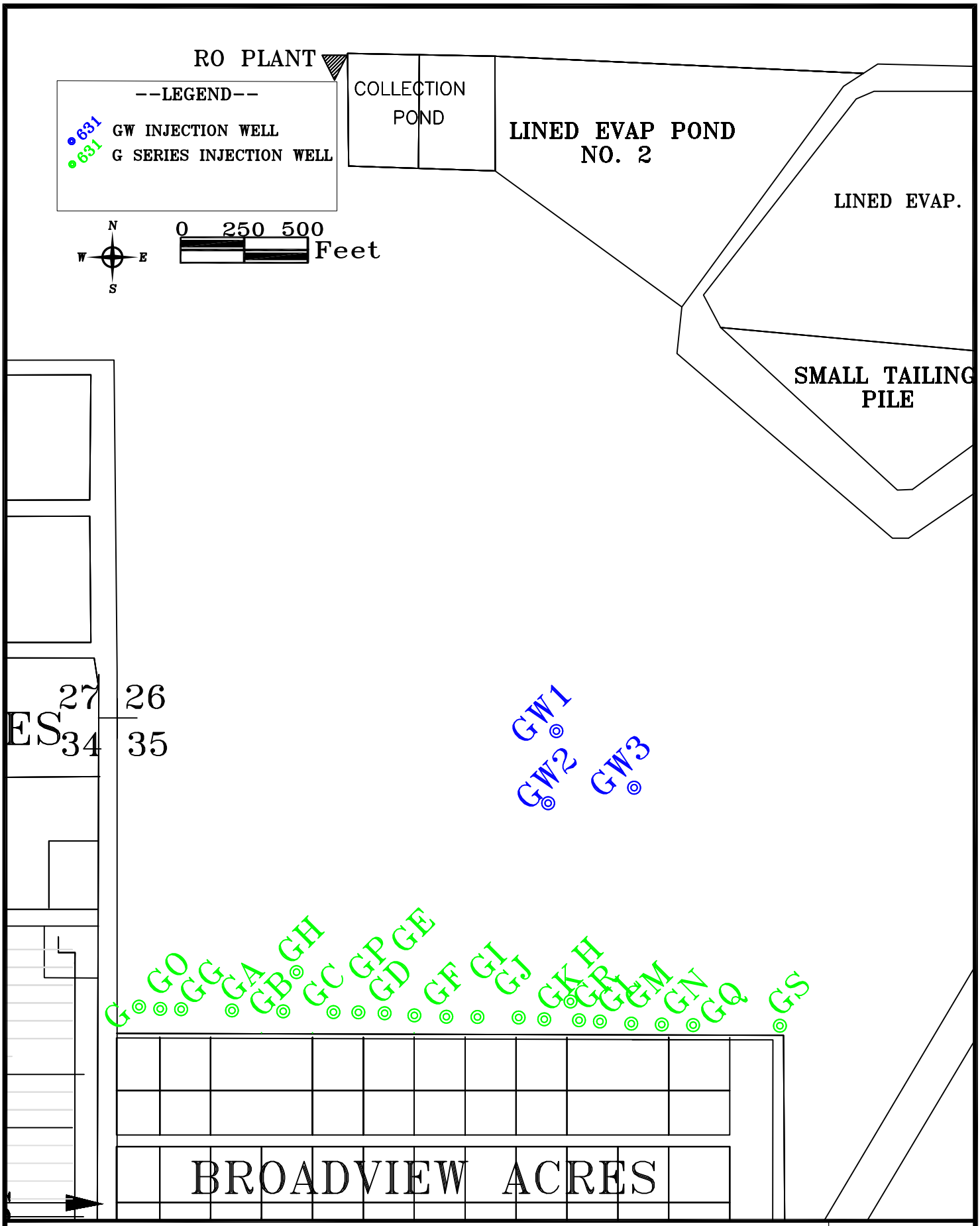

HOMESTAKE MILL AND ADJACENT PROPERTIES ~ GRANTS, NM ~ TOWNSHIP-11&12N, RANGE-10W

FIGURE 1. LOCATION OF INJECTION WELLS GW1, GW2 AND GW3

DATE:

SCALE: 1"=500'

PAGE: